



# PERSONNEL CERTIFICATION GUIDE

## CNG Fuel System Inspector (CNG-FSI)



*Helping Fuel the Future Safely*

October 2009

PERSONNEL CERTIFICATION SERVICES  
*Program Development – Individual Assessment*

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# Introduction

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## Purpose of this Handbook

This handbook provides information on the requirements to achieve and renew a Compressed Natural Gas (CNG) Fuel System Inspector personnel certification.

This personnel certification guide is provided for informational purposes only. The most current version of this manual, as published on the CSA Standards website, shall prevail in any case a discrepancy occurs between this version and the official released version of this guide.

## About CSA Standards

CSA Standards (an operating name of the Canadian Standards Association (CSA) and its wholly owned subsidiary CSA America, Inc.) is a not-for-profit, membership-based, solutions-oriented organization, serving business, industry, government and consumers in North America and the global marketplace. Our corporate vision is a better, safer, more sustainable world where standards work for people and business. CSA Standards achieves this goal by focusing on the development and delivery of standards and codes, application products, training, advisory services and personnel certification programs - all aimed at enhancing public safety, improving quality of life, preserving the environment and facilitating trade.

CSA Standards is a division of CSA Group which also includes: CSA International, a provider of testing and certification services for electrical, mechanical, plumbing, gas and a variety of other products; and OnSpeX, a provider of consumer product evaluation, inspection and advisory services for retailers and manufacturers.

As technologies continue to grow and evolve, and as the labor force grows more mobile, so has the need for a method to consistently assess, certify and measure individual worker knowledge. In response to this growing need, CSA America, Inc. develops and manages personnel certification programs to the requirements of ANSI/ISO/IEC 17024:2003 *General Requirements for bodies Operating Certification Systems of Persons*. Current operating programs include CNG (Compressed Natural Gas) Fuel System Inspector, Gas Laboratory Technicians, Greenhouse Gas Inventory Quantifier, Greenhouse Gas Verifier, and Certified Medical Device Reprocessing Technicians.

CSA America, Inc. is an ANSI Accredited Certifier – Accreditation # 0779 for the CNG Fuel System Inspector personnel certification program.

## Certification Contact Information

CSA Standards  
Personnel Certification Coordinator  
8501 East Pleasant Valley Road  
Cleveland, OH 44131  
Phone: (877) 235-9791  
Fax: (877) 539-7613  
Email: [personnel-certification@csa-america.org](mailto:personnel-certification@csa-america.org)  
[www.csa-america.org](http://www.csa-america.org)



# CNG Fuel System Inspector Certification

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## About this Certification

The CNG Fuel System Inspector Certification was developed to meet the needs of fleets of all sizes that use safe, cleaner-burning natural gas to power their vehicles. There are currently over 300,000 CNG cylinders in vehicular use in the U.S. marketplace.

CNG cylinders and fuel systems must be visually inspected for external damage and deterioration after a motor vehicle fire or accident and at least every 36 months or 36,000 miles, or at the time of any re-installation.

The inspection is to be performed by a qualified inspector in accordance with the manufacturer's recommendations and the inspection procedures provided in Compressed Gas Association (CGA) pamphlet C-6.4. A CNG Vehicle Fuel System inspector inspects containers, valves, PRDs and other fuel system components, applying appropriate knowledge and skill to assure the safety of compressed natural gas powered vehicles.

CSA Standards' CNG Vehicle Fuel System Inspector program addresses the need to ensure the competency of the persons conducting periodic, visual inspections of CNG fuel systems including cylinders used for on-vehicle fuel storage.

CSA Standards' CNG Fuel System inspector certification is designed to certify that an individual will have demonstrated proficiency in inspecting compressed natural gas vehicle fuel systems, identifying and documenting defects, and the safe handling and cleaning of fuel system components, enabling them to perform assigned tasks safely, and possesses the body of knowledge recommended by Federal Motor Vehicle Safety Standard (49CFR571.304) and the "NGV2 Standard for CNG Cylinder Containers."

CNG Fuel System Inspector Certification offers consistent assessment of an individual's proficiency in the area of CNG fuel system inspection and provides formal recognition of an inspector's knowledge and understanding. The program helps to reinforce the need for candidates to be adequately trained and then tested to levels of competence set by a committee of acknowledged experts. Procedures are also in place to periodically re-assess certified inspectors to ensure they remain up to date on technical developments and industry changes.

Vehicle owners also benefit because the program develops a pool of certified inspectors from whom they can confidently obtain the recommended system inspections. Our CSA Standards website contains a national registry of certified CNG Fuel System Inspectors across the U.S. and Canada.

## Qualifications of a Certified CNG Fuel System Inspector

The CNG Fuel System Inspector certification tests each candidate's knowledge to ensure the candidate possesses the knowledge and skills of the CNG fuel system inspector known as the minimally qualified candidate (MQC). CSA's expert committee defines the minimally qualified candidate as follows:

A qualified inspector will inspect for and document damage or other problems and recommend proper action to assure fuel system safety.

The MQC can perform CNG fuel system inspector activities without assistance, including:

- Knowledge of the types of containers used in CNG Vehicle Fuel Systems and damage allowances for each type
- Understanding of inspection requirements, tests and procedures
- The container manufacturer's current inspection guidelines readily available

# CNG Fuel System Inspector Certification

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## Certification Prerequisites

There is no requirement for formal training to become a certified CNG Fuel System Inspector. Candidates can obtain experience and knowledge to take the exam through:

- Participation in an instructor-led training course consisting of practical performance and academics  
and/ or:
- Knowledge of industry codes and standards, government regulation and industry practices  
and/ or:
- Cylinder manufacturer training specific to the manufacturer's product  
and/or:
- On the job training

## Training Resources

Although specific training is not required for certification, a number of instructor led training course are available through nationally recognized institutions. For a list of training resources, please visit CSA Standards' website at: [www.CSA-America.org](http://www.CSA-America.org). CSA Standards does not endorse any organization and provides this list as a resource for individuals seeking additional information.

# Certification Process

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## Application Process

To become a Certified CNG Fuel System Inspector an applicant must:

1. Submit a signed application form
2. Sign and adhere to the professional code of ethics
3. Submit all required fees
4. Pass a written exam

**All fees are due when submitting the application.**

**An e-mail address must be included** as this will be the primary mode of communication regarding the steps in the certification process.

CSA Standards will process applications in the order received. If an application is incomplete, CSA Standards will notify the applicant via e-mail of the deficiencies found in the application. Those deficiencies must be corrected before the candidate will be approved to take the certification exam.

All applicants will receive a confirmation e-mail regarding their registration and certification eligibility requirements.

Each new application has a life span of six (6) months from the time it is received. The applicant must fulfill all requirements of the certification process within that time period. If an applicant is unable to complete the certification process within that period of time, the application will expire and the applicant must restart the certification process including payment of any application or examination fees.

The certification application is provided at the end of this document.

## Program Fees

Application Fee	\$95.00
Examination Fee	\$280.00
Re-examination Fee	\$200.00
Annual Administration Fee	\$50.00
Replacement Certificate Fee	\$10.00

## Payment and Refund Policy

Payment of the fees must be submitted with the completed and signed application. CSA Standards accepts checks, Visa, MasterCard and American Express as payment in US dollars.

When the payment has been received, and the application is processed, notification will be sent regarding the next steps:

- Request for additional information
- Application audit (if selected)
- Exam scheduling notification.

Application fees are non-refundable.

Exam fees may be refunded if a written request is submitted at least one month prior to a scheduled exam date and at least one month prior to the examination eligibility expiration date. CSA Standards will retain the application fee **and** a processing fee of \$95 US Funds.

# Certification Process

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## Audit Process

The submission of an application indicates the applicant's agreement to comply with the terms of CSA Standards' audit process. All applications are subject to an audit and a percentage of applications are randomly selected for audit. Please note that while the selection process for an audit is primarily random, CSA Standards reserves the right to select any applicant to be audited at any time, including after the credential has been awarded. If the applicant fails to meet the audit requirements after attaining the credential, the applicant is not entitled to a refund.

The applicant will be notified when the application and fee is received if the submitted application is selected for audit. An audit notification will be sent to the applicant electronically and will provide detailed information on how to comply with the terms of the audit. During an audit, the applicant will be asked to submit supporting documentation required by the certification requested that may include, but is not limited to, the following:

- Copies of diploma or a global equivalent;
- Signatures from supervisor(s) or manager(s) for the skills, experience and/or responsibilities if required and documented in the experience section of the application and on the performance checklist;
- Copies of certificates and/or letters from the training institution(s) for any mandatory course if documented on the application;
- Copies of certificates and/or letters to demonstrate the required amount of professional development; and
- Other items required by the credential applied for.

Once documentation is provided, the audit should take approximately two weeks to complete. The applicant may not continue with the certification process until the applicant has complied with the audit requirements.

Once the applicant has successfully completed the audit, the applicant will be permitted to continue the certification process and will be notified of his/her examination eligibility. If the applicant fails to meet the audit requirements, a refund may be given, dependent upon the stage of the certification process at the time of the audit. (Refer to the Payment and Refund Policy section of this handbook for more details).

## Examination Administration and Scheduling

The Certified CNG Fuel System Inspector certification is administered through CSA Standards' test vendor, Castle Worldwide, at test sites located throughout North America. Once a candidate has submitted all the required information and has been approved to take the certification exam, CSA Standards will send the candidate's information to the test vendor for processing. Within 2 -3 business days after that, the test vendor will e-mail the candidate the "Notice to Schedule" (NTS) which includes instructions on scheduling their exam session. Once the candidate receives their NTS, they will be able to register for the exam at the test site/date they choose. Candidates must submit the scheduling request at least 10 business days prior to the requested examination date. Applicants should save all examination scheduling verifications for their records. Testing sites are normally within a short driving distance from most candidates.

CSA Standards uses computer-based testing (CBT) to deliver its certification examinations. However, in certain situations, paper-based tests may be offered following specific industry events or following selected training courses when a certified exam proctor is available. Please refer to CSA Standards' website for a listing of dates/locations for paper-based test delivery. CSA Standards reserves the right to cancel a scheduled paper-based test in the event that there are fewer than 10 candidates registered.

## Examination Eligibility

The examination eligibility period is six (6) months from the time an application is received. Applicants may take the examination up to three times within the six month period if they do not pass on the first attempt. (As noted below, re-examination fees apply to the second and third attempts to pass the examination.)

# Certification Process

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## Re-examination

During the examination eligibility period, an applicant may take the examination up to three times.

Re-examination fees apply to the second and third attempts to pass the examination, and re-examination fees must be paid in full in order to schedule an exam. If the eligibility period expires without achieving a passing score, the applicant must reapply for the certification.

## Examination Language

The CSA Standards certification examination for CNG Fuel System Inspector is administered in English.

## Examination Special Accommodation

The administration of the exam may be modified to accommodate special needs at the request of the candidate. Please submit supporting documentation with the completed application.

## Certificate Issuance

Upon passing the certification exam, each Certified CNG Fuel System Inspector will be issued a certificate indicating the valid timeframe of the certification.

## Replacement of Certificates

CSA Standards may issue a replacement certificate if a CNG Fuel System Inspector certificate has been lost or destroyed, or if the Certified CNG Fuel System Inspector's name has changed and the original certificate is returned to CSA Standards. A replacement fee will be charged.

## Certification Period

CSA Standards' Certified CNG Fuel System Inspector (CNG-FSI) certification is valid for a period of 3 years. Certified CNG Fuel System Inspectors are required to submit all required fees during the certification period.

## Use and Requirements for Use of Certificates and Logos/Marks

Once an individual receives his/her certification letter and certificate the individual may represent themselves as a Certified CNG Fuel System Inspector (CNG-FSI) under CSA Standards' Certified CNG Fuel System Inspector Personnel Certification Program.

Certification under this program does not authorize the certified individual any rights to the use of CSA Standards' name or logo (mark). All requests for use of the mark must be made in writing and expressly authorized by CSA Standards. As part of the program monitoring, CSA Standards routinely reviews advertisements, catalogs, websites and promotional material to confirm compliance. Unauthorized use of the CSA Standards mark constitutes cause to initiate procedures for withdrawal of certification and in severe cases may constitute grounds for legal action.

## Professional Code of Ethics

Certified CNG Fuel System Inspectors affirm adherence to a professional code of ethics. Applicants must review and sign the Code of Ethics when applying to CSA Standards for certification. A copy of the Code of Ethics is included in this handbook with the certification application.

## Non-Discrimination

Participation in CSA Standards' personnel certification programs is open on a non-discriminatory basis to all individuals and does not require membership in any association.

# Certification Process

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## Confidentiality

CSA Standards will maintain confidential information received from the individual and will not disclose such information to any third party without prior written approval by the individual; except in response to a subpoena, court order or other compulsory process. CSA Standards will provide written notification to the individual at least five (5) business days prior to releasing such information.

## Certificate Renewal

CNG Fuel System Inspector certificates expire every three years. Generally, CSA Standards will issue a renewal notice and application form 90 days prior to the date when the certificate expires. Certified CNG Fuel System Inspectors who apply for renewal, meet the renewal qualifications, and pay the required fee will receive a new certificate containing the new expiry date.

## Recertification Requirements

CNG Fuel System Inspectors may apply for recertification up to 6 months prior to their certificate expiration date and no later than 3 months after expiration. CNG Fuel System Inspectors applying for certification more than 3 months after expiration of their certification must fulfill all requirements of the initial certification process.

A CNG Fuel System Inspector may recertify by successfully completing the CNG-FSI certification exam.

## Refusal to Issue or Renew a Certified CNG Fuel System Inspector Certificate

CSA Standards may refuse to issue or renew a CNG Fuel System Inspector's certificate:

1. For any of the circumstances under which CSA Standards can revoke or suspend a certificate; or
2. The certificate to be renewed was revoked or suspended by CSA Standards.

## Revocation or Suspension of a Certified CNG Fuel System Inspector's Certification

CSA Standards reserves the right to withdraw the certification of any person violating the policies and procedures of the certification process.

CSA Standards may revoke or suspend a CNG Fuel System Inspector's certification for any of the following reasons:

1. The application was fraudulent or contained inaccurate information;
2. The person was discharged from his/her employment for incompetence, unless the person has not yet exhausted the rights of appeal available in his/her organization;
3. The person has previously had a Certified CNG Fuel System Inspector Certification revoked; or
4. The person has failed:
  - a. To exercise the level of care, diligence and skill that a reasonably prudent verifier would be expected to exercise in a similar situation;
  - b. To act honestly, competently and with integrity; and
  - c. To meet or has contravened any condition that is set out in his or her certificate.

Upon a notice of termination of a CNG-FSI certification, the individual will immediately terminate the use of CSA Standards' certification mark, if permission for use of the mark had been granted. Additionally, the individual will cease all use of or reference to the CSA Standards certification and the CNG-FSI designation. Individuals have the right to appeal as outlined in the appeals process below.

## Voluntary Withdrawal of Certification

Individuals wishing withdrawal of the CNG Fuel System Inspector Certification must submit a request in writing to CSA Standards. Once approved, the individual will be removed from the National Registry and must immediately cease any use of or reference to the CSA Standards certification. Individuals wishing to reinstate their certification must apply for certification as outlined in the certification process.

# Certification Process

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## Appeals, Complaints, and Disputes

CSA Standards' certification programs are administered and supervised by the U.S. division, CSA America, Inc., in Cleveland Ohio. All challenges to the certification program are governed by CSA Standards' Appeals and Complaint Procedures.

Any individual shall have the right to appeal all decisions relating to CSA Standards' personnel certification program including, but not limited to: testing, denial or termination of certification. A written notice of intent to appeal shall be sent to CSA Standards within five (5) business days of the individual's receipt of the decision, which forms the basis for appeal.

CSA Standards shall arrange an appeal meeting with the individual at CSA Standards' headquarters or other mutually agreed to location, within ten (10) business days of the receipt of the written request to appeal. The individual and a CSA Standards representative, who was not involved in the original decision causing the appeal, will attend and participate in the meeting. At this meeting, the individual may not be represented by counsel unless CSA Standards has been notified at least five (5) business days prior to the meeting. CSA Standards shall provide its decision within five (5) business days after the meeting has taken place.

If the individual still disputes the decision made by CSA Standards after the appeal meeting, the individual has the right to appeal to an independent and impartial Appeals Board as outlined below.

## Appeals Board

Upon receipt of a written intent by the individual to appeal to the Appeals Board, CSA Standards shall arrange the Appeals Board hearing within ten (10) business days of the receipt of the request and notify the individual and responding parties. The individual may be represented by counsel at this meeting.

No individual or agent thereof, nor any person with any interest, directly or indirectly, in such individual, shall serve on the Appeals Board.

The Appeals Board hearing shall be informal and private. The individual shall be given a full opportunity to present any material or proofs relevant to the issue. Formal rules of evidence shall not be applicable. The Appeals Board shall determine the relevance and materiality of any evidence presented.

When the individual has had a full opportunity to submit their case, the Appeals Board may declare the hearing closed and shall provide the individual and CSA Standards with a decision, including a brief description of its reasons, within ten (10) business days. Decisions of the Appeals Board shall be by majority vote.

All costs related to the Appeals Board are the responsibility of the individual and are due within ten (10) business days of the billing, unless the Appeals Board sides with the individual's position, in which case CSA Standards will be responsible for the costs.

# Examination Preparation and Completion

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## General Description

The CNG Fuel System Inspector certification exam consists of approximately 68 multiple-choice questions. Examination questions have only one correct answer. Each exam question is independent and does not rely on the correct answer to any other questions.

CSA Standards may include an additional 10 questions in the exam for statistical evaluation of future examination questions. These additional questions are not included as part of the examination score. These questions will not be identified in the exam, so it is important that the candidate answer every question completely. The candidate's grade is based on the number of scored items answered correctly.

The candidate will have two hours (120 minutes) to complete the exam. Exams are closed book. No reference materials may be used during the course of the exam.

## Exam Content

The exam is based on categories of tasks and knowledge required by a CNG Fuel System Inspector. The table below outlines the examination content by category for the CNG Fuel System Inspector Certification.

### **Categories:**

Preparation for Inspection

Determine Inspection Requirements

Pressure Relief Device (PRD) Inspection

Physical Inspection of Brackets and High-pressure Components

Physical Assessment of Cylinder

Original CNG Fuel System Installation

Inspection Reporting

## Pass-Fail Standard

CSA Standards' CNG Fuel System Inspector certification examination passing standard is established utilizing standard psychometric guidelines and is determined using a criterion-reference technique. A criterion-referencing score judges a candidate based on a predetermined standard of knowledge or skill. This predetermined standard is defined as the minimum score that would be expected from candidates who have the level of knowledge and skills needed to competently conduct their work responsibilities.

## Exam Delivery

The CNG-FSI certification exam will be delivered electronically at our computer-based testing center locations on demand, or as a written (paper and pencil) exam during scheduled exam sessions.

For the paper and pencil exams, all answers will be recorded on the provided exam answer sheet using a No. 2 pencil. No marks may be made in the exam booklet.

# Examination Preparation and Completion

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## Examination General Instructions

During the exam, the proctor will be responsible for supervising the exam in such a way as to ensure that exam security is maintained. As such, all candidates are expected to adhere to the following guidelines during the test sessions.

A candidate's participation in any irregularities occurring during the examination, such as giving or obtaining unauthorized information or aid, as evidenced by an observation or subsequent statistical analysis, may be sufficient cause to terminate participation, invalidate the results of the examination, or other appropriate remedy.

### To be admitted to the examination the candidate must:

- Submit their **CONFIRMATION NOTICE** to the proctor.
- Bring **current photo identification with signature** (driver's license, immigration card, passport, etc.). **The candidate will NOT be admitted without proper identification.** If there are any questions concerning the type of picture ID, the candidate should contact CSA Standards.
- Report on time.

### During the Exam:

- Smoking is NOT permitted in the examination site.
- Food and beverages are NOT allowed in the examination area.
- All personal items including books, notebooks, other papers, all electronic equipment (i.e. cell phones, cameras, etc.), book bags, coats, etc. will NOT be allowed in the exam room and must be left outside of the exam room **AT YOUR OWN RISK.**
- Friends and relatives, including children, will NOT be allowed in the examination building.
- Computer-based testing facilities offer exam services to multiple agencies. There may be other individuals in the testing room with the candidate who are sitting for exams from different organizations. The rules for their exam may be slightly different than the rules for the CSA candidate's exam in terms of exam time, and what is and is not allowed at their station.
- Computer-based tests are delivered via secure Internet connections. Internet connections are subject to the local Internet providers in the area. While it is not the norm, Internet connections can, on occasion, be lost momentarily, requiring the proctor to log the candidate back into his/her examination. If this occurs, the candidate should inform the proctor that the connection has been lost and the proctor will assist the candidate in logging back into the exam. The exam time remaining will be exactly the same as it was when the Internet connection was lost.

### Prohibited Items:

Candidates are expressly prohibited from bringing the following items into the exam room:

- cameras, cell phones, optical readers, or other electronic devices that include the ability to photograph, photocopy or otherwise copy test materials
- notes, books, dictionaries or language dictionaries
- book bags or luggage
- ipods, mp3 players, headphones, or pagers
- calculators (except as expressly permitted by the test sponsor), computers, PDAs, or other electronic devices with one or more memories
- personal writing utensils (i.e., pencils, pens, and highlighters)
- watches
- food and beverage
- hats, hoods, or other headgear

If the proctor determines that the candidate has brought any such items to the test site, the items may be demanded and held by testing center staff. Test center reserves the right to review the memory of any electronic device to determine whether any test materials have been photographed or otherwise copied. If the review determines that any test materials are in the memory of any such device, the test center reserves the right to delete such materials and/or retain them for subsequent disciplinary action.

## Examination Preparation and Completion

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Upon completion of the review and any applicable deletions, the test center will return the device to the candidate, but will not be responsible for the deletion of any materials that may result from our review, whether or not such materials are test materials. By bringing any such device into the test site in contravention of our policies, the candidate expressly waives any confidentiality or other similar rights with respect to the candidate's device, our review of the memory of the candidate's device and/or the deletion of any materials. The test vendor, the examination site, and the test administration staff are not liable for lost or damaged items brought to the examination site.

### Environment

Examination room temperature can be unpredictable; therefore, we suggest that the candidate bring appropriate clothing (e.g. sweater or sweatshirt without pockets) to help to adapt to a cooler or warmer climate in the examination room. The candidate should bring ear plugs if he/she is sensitive to noise.

### Exam Security

All content, specifically questions and answers are the proprietary and confidential property of CSA Standards. They may not be copied, reproduced, modified, published, transmitted, or distributed in any manner without the express written authorization of CSA Standards. Candidates must take no action to compromise the integrity or confidential nature of the exam and its contents.

### Exam Results Notification

Approximately two weeks after completion of the exam, the candidate will receive official notification of the exam score from CSA Standards. Candidates passing the exam and fulfilling all program requirements will also receive a certificate with the effective date of certification. In order to protect the candidate's confidentiality, under no circumstances will test scores be given by telephone or e-mail.

# Examination Body of Knowledge and Blueprint

## Examination Knowledge Reference Documents

The following list of publications represents the body of knowledge used in the development of the CNG Fuel System Inspector Certification.

Objective	NVV1-2006	NGV2-2007	PRD1-1998, 1a, 1b	CGA C-6.4-2007	NFPA 52 (2006)	49CFR571.304	49CFR180.205	GTI -Cylinder Care and Maintenance	CVEF Bulletin	PRD Safety Notice
Preparation for Inspection		●		●		●				
Determine Inspection Requirements		●		●	●	●	●			
Pressure Relief Device (PRD) Inspection		●	●	●	●					●
Physical Inspection of Brackets and High-pressure Components				●	●			●		
Physical Assessment of Cylinder		●		●	●	●			●	
Original CNG Fuel System Installation	●			●	●					
Inspection Reporting				●						

ANSI/ CSA, 2006, *ANSI/ CSA NGV1 - 2006: American National Standard/ CSA Standard for Compressed Natural Gas Vehicle (NGV) Fuelling Connection Devices*

ANSI/ CSA, 2007, *ANSI NGV2-2007: American National Standard for Natural Gas Vehicle Containers*

ANSI/ CSA, 1998, *ANSI/ CSA PRD1-1998: American National Standard for Pressure Relief Devices for Natural Gas Vehicle (NGV) Fuel Containers, Revisions Original, 1a and 1b*

Compressed Gas Association, 2007, *CGA C-6.4-2007: Methods for External Visual Inspection of Natural Gas Vehicle (NGV) and Hydrogen Vehicle (HV) Fuel Containers and Their Installation, Third Edition*

NFPA, 2006, *NFPA 52: Vehicular Fuel System Code, 2006 Edition*

Department of Transportation, Federal Motor Vehicle Safety Standard 49CFR571.304: Compressed Natural Gas Fuel Container Integrity.

Department of Transportation, Federal Motor Vehicle Safety Standard 49CFR180.205: General Requirements for re-qualification of specification cylinders

Gas Technology Institute, *GTI-01/0119: Cylinder Care and Maintenance Handbook*

# Examination Body of Knowledge and Blueprint

The following exam objectives were developed by a group of industry experts. The weighting of each objective was determined through industry survey. The following table outlines the knowledge and skills required for each objective.

<b>Section 1 : Preparation for Inspection</b> 13% of Exam	
<b>Objective 1.1: Assess Vehicle History</b>	
<b>Knowledge</b>	<b>Apply Skills</b>
<ul style="list-style-type: none"> <li>Know incident types that may cause damage that is not detectable by inspection.</li> </ul>	<ul style="list-style-type: none"> <li>Question the owner/fleet manager about the vehicle.</li> <li>Know how to search service records</li> <li>Know how to check vehicle for collision, damager, fire, etc.</li> <li>Search VIN number for accident related incidents</li> </ul>
<b>Objective 1.2: Identify potential high-pressure gas safety hazards</b>	
<b>Knowledge</b>	<b>Apply Skills</b>
<ul style="list-style-type: none"> <li>Know the dangers of cylinder rupture and component failure</li> <li>Know how to assemble and disassemble system</li> <li>Know the consequences of improperly secured PRD vent lines</li> </ul>	<ul style="list-style-type: none"> <li>Listen for leaks</li> <li>How to operate different types of valves</li> </ul>
<b>Objective 1.3: Employ proper cleaning and handling methods to prevent damage to the fuel system.</b>	
<b>Knowledge</b>	<b>Apply Skills</b>
<ul style="list-style-type: none"> <li>Know which types of cleaning solutions are appropriate for different materials</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate proper method for lifting and moving the cylinders</li> <li>Know which types and when to use certain cleaning tools</li> </ul>
<b>Objective 1.4: Given a scenario, identify the appropriate sequence of inspection steps</b>	
<b>Knowledge</b>	<b>Apply Skills</b>
<ul style="list-style-type: none"> <li>Know what is required of an inspection</li> <li>How to look up cylinder specifications</li> <li>Know which steps are critical first in sequence</li> </ul>	<ul style="list-style-type: none"> <li>Organize a work plan and use a checklist</li> </ul>
<b>Objective 1.5: Demonstrate a familiarity with natural gas and its characteristics.</b>	
<b>Knowledge</b>	<b>Apply Skills</b>
<ul style="list-style-type: none"> <li>Know properties of NG</li> </ul>	<ul style="list-style-type: none"> <li>Recognize NG odorant</li> <li>Recognize when unodorized NG is used</li> </ul>

# Examination Body of Knowledge and Blueprint

## Section 2: Determine Inspection Requirements 9% of Exam

**Objective 2.1:** Identify the cylinder manufacturer and the standard under which the cylinder was manufactured by looking at the label or serial number.

### Knowledge

- Know past and present cylinder manufacturing companies
- Know the standard under which the cylinder was manufactured

### Apply Skills

- Familiarity with label layout, difference between part numbers and serial numbers

**Objective 2.2:** Select the proper inspection standard and/or the manufacturer's inspection recommendations based on the label.

### Knowledge

- Familiarity with inspection standards
- Know if there is a manufacturer's standard that's applicable to the vehicle
- Know that the manufacturer's standard always goes first

### Apply Skills

- Ability to interpret the standards

**Objective 2.3:** Determine which NFPA 52 requirements apply to the vehicle being inspected.

### Knowledge

- Know the dates of the past NFPA 52 revisions
- Know how to recognize the labeling of an OEM-certified vehicle vs. an aftermarket conversion

### Apply Skills

- How to correlate your vehicle with NFPA 52

**Objective 2.4:** Verify that the cylinder inspection documents are appropriate to the vehicle being inspected.

### Knowledge

- Know the dates of the past inspection documents revisions
- Know how to recognize the labeling of an OEM-certified vehicle vs. an aftermarket conversion

### Apply Skills

- How to correlate your vehicle with inspection documents

**Objective 2.5:** Know the sources of additional inspection information and explain where to find them.

### Knowledge

- Know the cylinder, component, system, vehicle manufacturers

### Apply Skills

- Accessing contact information

# Examination Body of Knowledge and Blueprint

Section 3: Pressure Relief Device (PRD) Inspection 7% of Exam	
<b>Objective 3.1:</b> Given a scenario, inspect PRD piping for damage, obstructions, restrictions and verify that it is properly sealed to prevent foreign material from entering.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know what a venting system looks like</li> <li>• Know function and appearance of venting systems</li> <li>• Know the different types of PRD channel configurations</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Recognize different types of damage</li> <li>• Recognize probable modifications</li> </ul>
<b>Objective 3.2:</b> Identify visible damage and assess serviceability of PRDs and verify that installed PRD has not been recalled.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know how to recognize a PRD</li> <li>• Know the location of PRDs</li> <li>• Know lists of manufacturers</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Know how to find the list of recalled PRDs</li> </ul>
<b>Objective 3.3:</b> Recognize if the PRD vent line is properly routed, supported and adequate for venting pressure.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know requirements for PRD vent lines</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Experience looking at acceptable systems</li> </ul>
<b>Objective 3.4:</b> Identify PRD damage or high-pressure PRD line damage that would require immediate cylinder defueling.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know what a good PRD looks like</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Be able to differentiate between original manufacturer versus later extrusion of the eutectic trigger</li> </ul>
Section 4: Physical Inspection of Brackets & High-Pressure Components 18% of Exam	
<b>Objective 4.1:</b> Identify missing components or damage to guards and covers that could affect cylinder or system integrity.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know in which situations guard covers are required</li> <li>• Know different designs of guards and covers</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Rubber gaskets and clearance requirements</li> </ul>
<b>Objective 4.2:</b> Assess the condition of CNG cylinder mounting systems.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• N/A</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Know how to identify systems that have been degraded</li> <li>• How to identify missing or out of place rubber isolation gaskets</li> <li>• How to identify over tightened brackets</li> <li>• How to identify misaligned brackets</li> </ul>
<b>Objective 4.3:</b> Identify CNG fuel system components and describe their functions.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know the major components</li> <li>• Know the function of each component based on its appearance and location in the system</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Recognize defective, damaged or missing components</li> </ul>
<b>Objective 4.4:</b> Recognize system defects that would require a partial or full system defueling.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know defects associated with system components</li> <li>• Know functions of system components</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Recognize different degrees of component damage</li> </ul>

# Examination Body of Knowledge and Blueprint

**Objective 4.5:** Verify that the CNG fuel system is free of natural gas leaks.

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know how to identify leaks by sound, smell, sight</li> <li>Know which leak-detection fluids are safe for use</li> <li>Know that C-6.4 gives basic guidance on leak detection</li> </ul>	<ul style="list-style-type: none"> <li>Proper use of leak-detection fluids and equipment and methods</li> </ul>

## Section 5: Physical Assessment of Cylinder 38% of Exam

**Objective 5.1:** Classify the type of cylinder damage, assess the level of cylinder damage, and then determine the appropriate action.

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know types of damage</li> <li>Know the three levels of damage</li> <li>Know where to find the criteria to determine the level of damage</li> </ul>	<ul style="list-style-type: none"> <li>Determine levels of damage</li> <li>How to use a depth gauge and tape measure</li> </ul>

**Objective 5.2:** List the cylinder label information

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know different types of labels</li> <li>Know what is required on labels</li> <li>Know different formats of labels</li> </ul>	<ul style="list-style-type: none"> <li>Verify that the cylinder label is present and visible</li> <li>Verify that the cylinder is marked for CNG use</li> <li>Verify that the container service life has not expired</li> </ul>

**Objective 5.3:** Recognize Level II or Level III damage that requires defueling for safety measures

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know types of damage</li> <li>Know level II or III damage</li> <li>Know where to find the criteria to determine the level of damage</li> </ul>	<ul style="list-style-type: none"> <li>Determine levels of damage</li> <li>How to use a depth gauge and tape measure</li> </ul>

**Objective 5.4:** Select the proper measuring tool to assess the level of cylinder damage

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know appropriate tools for appropriate uses</li> </ul>	<ul style="list-style-type: none"> <li>How to read and calibrate the tools</li> </ul>

**Objective 5.5:** Determine when you need to consult the cylinder manufacturer to determine the level of damage.

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Applying standards to actual situations</li> </ul>

**Objective 5.6:** Demonstrate familiarity with the concept of pressures and temperature relationships as applied to cylinder operating requirements.

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know temperature pressure relationship</li> <li>Know the service pressure may not be the fill pressure</li> <li>Know maximum permissible fill pressure</li> </ul>	<ul style="list-style-type: none"> <li>How to read pressure gauges and thermometers</li> </ul>

**Objective 5.7:** Given a scenario, recognize the different types of CNG cylinder materials and construction.

Knowledge	Apply Skills
<ul style="list-style-type: none"> <li>Know different types of cylinder materials</li> <li>Know construction methods</li> <li>Know how different materials respond to damage mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Be able to recognize different cylinder materials and construction methods</li> </ul>

# Examination Body of Knowledge and Blueprint

Section 6: Original CNG Fuel System Installation 10% of Exam	
<b>Objective 6.1:</b> Determine that cylinders, brackets, components, and shielding are installed to prevent damage and safety hazards.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know components applicable to NG systems</li> <li>• Know which components can be supported by piping</li> <li>• Know ground clearance requirements</li> <li>• Know acceptable locations for cylinders</li> <li>• Know acceptable mounting and bracketing</li> <li>• Know heat shielding requirements</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Recognize different types of components and their application</li> </ul>
<b>Objective 6.2:</b> Verify that the pressure ratings of the cylinder and all other labeled system components are equal to or greater than the vehicle pressure rating.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know how to determine the system pressure rating from the vehicle label</li> <li>• Know where to find and how to read pressure ratings on components</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• How to determine if pressure reading from label matches component pressure ratings</li> </ul>
<b>Objective 6.3:</b> Verify the existence, location and operation of shut off valves as per NFPA 52 or the manufacturer's specifications.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know when shut off valves are required</li> <li>• Know where shut off valves are likely to be found</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Know appropriate way to test shut off valves</li> <li>• How hard do you twist the shut off valve handle before you stop?</li> </ul>
<b>Objective 6.4:</b> Verify all required labels are installed and legible.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know which labels are required under various codes</li> <li>• Know which parts of labels are required to be legible</li> <li>• Know where labels are to be mounted</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Understand the markings on the labels</li> </ul>

Section 7: Inspection Reporting 5% of Exam	
<b>Objective 7.1:</b> Know how and when to fill out all areas of applicable inspection forms.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know which inspection form you need to use</li> <li>• Know to use the checklist during inspection</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Operate a digital camera</li> <li>• Know how to write a comprehensive description and recommendation</li> </ul>
<b>Objective 7.2:</b> Given an inspection scenario, explain which actions you recommend.	
<p style="text-align: center;"><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Know the consequences of various defect levels</li> <li>• Know how to communicate to non-technical customers</li> <li>• Know sources for appropriate repair or replacement</li> </ul>	<p style="text-align: center;"><b>Apply Skills</b></p> <ul style="list-style-type: none"> <li>• Communication with public, vendors, manufacturers</li> </ul>

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**CNG Fuel System Inspector (CNG-FSI) Personnel Certification Application Form**

PLEASE PRINT CLEARLY  
**Incomplete information will result  
in processing delays**

For Questions or Comments, please contact:  
Janet Slade  
Phone: 877-235-9791 x8443, or  
Janet.Slade@csa-america.org

**Return Form by:**

E-mail: personnel-certification@csa-america.org

Fax: 877-539-7613 Attention: Personnel Certification

Mail: CSA Standards  
Personnel Certification Program  
8501 East Pleasant Valley Rd.  
Cleveland, OH 44131-5575 USA

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I agree not to discuss or release in any form the contents of the exam. I affirm that all information provided in this application is correct. I agree to allow my name and certification information (and professional information if authorized above) to be posted on the CSA Standards website as part of the online registry of certified personnel.

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Date





## CNG Fuel System Inspector Personnel Certification Application

### Code of Ethics and Professional Conduct

This code of ethics sets forth the expectation that credential holders will commit to conducting themselves in a professional, honest and impartial manner.

This code of ethics applies to all CSA Standards Personnel Certification credential holders regardless of the certification designation, and includes the following professional conduct:

1. Provide equitable, honest and impartial treatment of customers;
2. Provide customers with accurate, objective, timely and understandable information;
3. Perform all services in a safe and professional manner;
4. Stay informed of and comply with all relevant laws, codes, regulations, standards and industry practices;
5. Protect proprietary and confidential information gained during the course of work; and
6. Promote positive activities which raise the level of professionalism of the industry.

### Certification Agreement

1. I agree to notify CSA Standards in a timely manner of changes concerning the information I have provided, including my current address, telephone number, and e-mail.
2. I have reported, and will continue to report, to CSA Standards, within sixty (60) days of occurrence, any matters, proceedings, lawsuits, settlements and/or other agreements, administrative agency actions, or organizational actions relating to my profession or occupation, including all complaints relating to my professional activities, and matters or proceedings involving, but not limited to certification, credentialing, malpractice, disciplinary ethics or similar matters. I also agree to promptly report, within sixty (60) days of occurrence, any felony criminal charges, convictions, or plea agreements or other criminal charges, convictions, or plea agreements relating to acts of dishonesty or unethical conduct.
3. I agree that CSA Standards has the right to communicate with any person, government agency or organization to review or confirm the information in this application or any other information related to my application for CSA Standards certification. Further, I agree to and authorize the release of any information requested by CSA Standards for such review and confirmation.
4. I understand that the CSA Standards credential status does not imply licensure, registration or government authorization to practice any specific job function or to engage in related activities.
5. I agree that all materials submitted to CSA Standards become the property of CSA Standards, and that CSA Standards is not required to return any of these materials to me.
6. I agree that upon achieving the CSA Standards credential, my name may be posted on the CSA Standards website as part of an Online Registry to be created and maintained by CSA Standards.
7. I agree that all disputes relating in any way to my application for a CSA Standards certification and/or my involvement generally in a CSA Standards certification program, will be resolved solely and exclusively by means of CSA Standards policies, procedures and rules, including the stated appeals process.
8. CSA Standards reserves the right to suspend or revoke my credential if it is determined I have failed to uphold, or otherwise breached this Agreement, or committed a violation of the CSA Standards Code of Ethics and Professional conduct.
9. I release and indemnify CSA Standards from all liability and claims that may arise out of, or be related to, my certification and related activities.

The Certification Application/Renewal Agreement may be revised periodically. I understand that it is my responsibility to obtain the most current copy online at [http://www.csa-america.org/personnel\\_certification](http://www.csa-america.org/personnel_certification)

As a CSA Standards Personnel Certification credential holder, I agree to conduct myself in a professional and thorough manner. I agree to the terms and conditions of my certification including adherence to the Code of Ethics and Professional conduct.

Signature		Date	
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